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CS 566

Draft Assignment 1

Q1.1

The information we can get from the give condition

PRECONDTIONS

1:The left bank and right should have the same number of zombies and Bluebeards, if not, they will fight.

2:The goat should stay with ferryman to keep it safe

3:The boat can only load 4 units at a time and only ferryman can operate the boat

The goals we need to achieve are postcondtions

POSTCONDDDITIONS

1:Move all units to the right bank

2:No conflict between zombies and Bluebeards

3:Goat is safe

Outcome

1:Goat stay with ferryman all times(which mean goat not leave the boat untill all zombies and Bluebeards transfer to the right bank) and Each time ferryman carry 2 zombies or 2 Bluebeards on the boat. But this will make unbalance number between zombies and Bluebeards

2:Each time ferryman left the goat on the left side and carry 1 zombie and 1 Bluebeard on the boat(to keep the same number of zombies and Bluebeards). But goat is not safe.

3:Goat stay with ferryman all times(which mean goat not leave the boat untill all zombies and Bluebeards transfer to the right bank) and Each time ferryman carry 1 zombie and 1 Bluebeard on the boat(to keep the same number of zombies and Bluebeards). So this is the best choice

Q2.2

Simply n represents the number of iterations required to find the gcd(s,t).

Explanation:

From the example , we can see we need to increment k unit s^k <=t ans s^(k+1) >=t. Like gcd(4,250), 4^4=256,m it is bigger than t. So the best k is 3 and 4^3=64. Then we can go from gcd(4,250), to gcd(4,186), to gcd(4,122),to gcd(4,58). Because 58 is less than 64, so we should us 4^2=16. Then we can get from gcd(4,58) to gcd(4,42), to gcd(4,26), to (4,10). For the same reason, we can get from gcd(4,10) to gcd(4,4). Then we can get gcd(2,2)=2. The total step should be 9(if add the progress of finding the s^(k+1) >=t,the total step should be 14). And there is one point we should notice is the value of n is depends on s and t.

Q2.4

To find the gcd(2,n) where n is odd, which mean gcd(2,n)=1. For example:when n=15(2^4-1=15). Then we can get gcd(2,15), Then we can get gcd(2,7) becasue k=3, then we do the same progress as 2.2. We can finally have gcd(2,15)->gcd(2,7)->gcd(2,3)->gcd(2,1).The total step should be 4. I have the same k value as 2.2 but when n is odd,it has less steps. And we can say Classical Euclidean algorithm is better than the algorithm described for Part 2